

MOLECULAR PHOTORESISTS CONTAINING NONPOLYMERIC SILSESQUIOXANES

ABSTRACT

A nonpolymeric silsesquioxane is provided wherein at least one silicon atom of the silsesquioxane is directly or indirectly bound to an acid-cleavable substituent R^{CL} . The silsesquioxane has a glass transition temperature T_g of greater than 50°C, and the R^{CL} substituent can be cleaved from the silsesquioxane at a temperature below T_g , generally at least 5°C below T_g . The remainder of the silicon atoms within the silsesquioxane structure may be bound to additional acid-cleavable groups, acid-inert polar groups R^P , and/or acid-inert nonpolar groups R^{NP} . The nonpolymeric silsesquioxane can be a polyhedral silsesquioxane optionally having one to three open vertices, such that the polyhedron appears to be a "partial cage" structure, or a macromer of two to four such polyhedral silsesquioxanes. Photoresist compositions containing the novel nonpolymeric silsesquioxanes are also provided, as is a method for using the compositions in preparing a patterned substrate.